

*POTAMOTRYGONOCOTYLE TSALICKISI*, NEW GENUS  
AND SPECIES (MONOGENEA: MONOCOTYLIDAE)  
AND *PARAHETERONCHOCOTYLE AMAZONENSIS*,  
NEW GENUS AND SPECIES (MONOGENEA:  
HEXABOTHRIIDAE) FROM *POTAMOTRYGON*  
*CIRCULARIS* GARMAN (CHONDRICHTHYES:  
POTAMOTRYGONIDAE) IN NORTHWESTERN BRAZIL

Monte A. Mayes, Daniel R. Brooks, and Thomas B. Thorson

*Abstract.*—Two new monogeneans are described from *Potamotrygon circularis* in northwestern Brazil. The first species, a monocotylid, most closely resembles members of *Heterocotyle* but differs by possessing oral glands and by lacking sclerites in the septa dividing the opisthaptor into loculi. The new species further possesses dorsal muscular papillae on the opisthaptor, a trait which members of *Neoheterocotyle* exhibit, but resembles *Neoheterocotyle* in no other diagnostic traits. The new genus *Potamotrygonocotyle* is proposed to accommodate the new species. The second new species, for which the new genus *Paraheteronchocotyle* is proposed, is a member of the Hexabothriidae. It differs from all other known hexabothriids by lacking anchors on the haptoral appendix. The new species exhibits sucker and hook morphology intermediate between two currently-recognized groups of hexabothriids. One group exhibits suckers and hooks of subequal size and the other exhibits suckers and hooks each comprising two different size classes. The new species possesses uniform-sized suckers and unequal-sized hooks.

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### Introduction

From 1975 to 1979, we conducted field studies collecting helminth parasites inhabiting freshwater stingrays (Potamotrygonidae) from northern and eastern South America. Among the helminths collected were specimens of two new species of monogeneans described herein. This report is the first record of any monogeneans inhabiting freshwater stingrays. Based on their morphological traits, we propose a new genus for each species.

### Materials and Methods

Hosts were harpooned by local fishermen and were examined alive or shortly after death. Gills were removed, placed in fresh water and examined for living monogeneans, or were preserved in 10% formalin for future ex-

amination. Living specimens were fixed with AFA and stored in 70% ethanol. Most specimens were stained with Mayer's hematoxylin, dehydrated, cleared with methyl benzoate, and mounted in Canada balsam. One specimen was prepared for histological examination using standard histological procedures, sectioned at 8  $\mu\text{m}$ , stained with hematoxylin-eosin, cleared with xylene, and mounted in a commercial resin. Measurements were made using an optical micrometer, according to the protocol described by Dillon and Hargis (1968); measurements are expressed in  $\mu\text{m}$  with the range followed by the mean in parentheses. Suckers of one of the species, a hexabothriid, were numbered by denoting as #1 the sucker nearest the haptor appendix and counting counterclockwise. Curved structures were measured in a straight line from one extreme to another; hook points were measured from the outside of the distal end to the outside of the proximal end. Figures were prepared with the aid of a drawing tube.

*Potamotrygonocotyle*, new genus

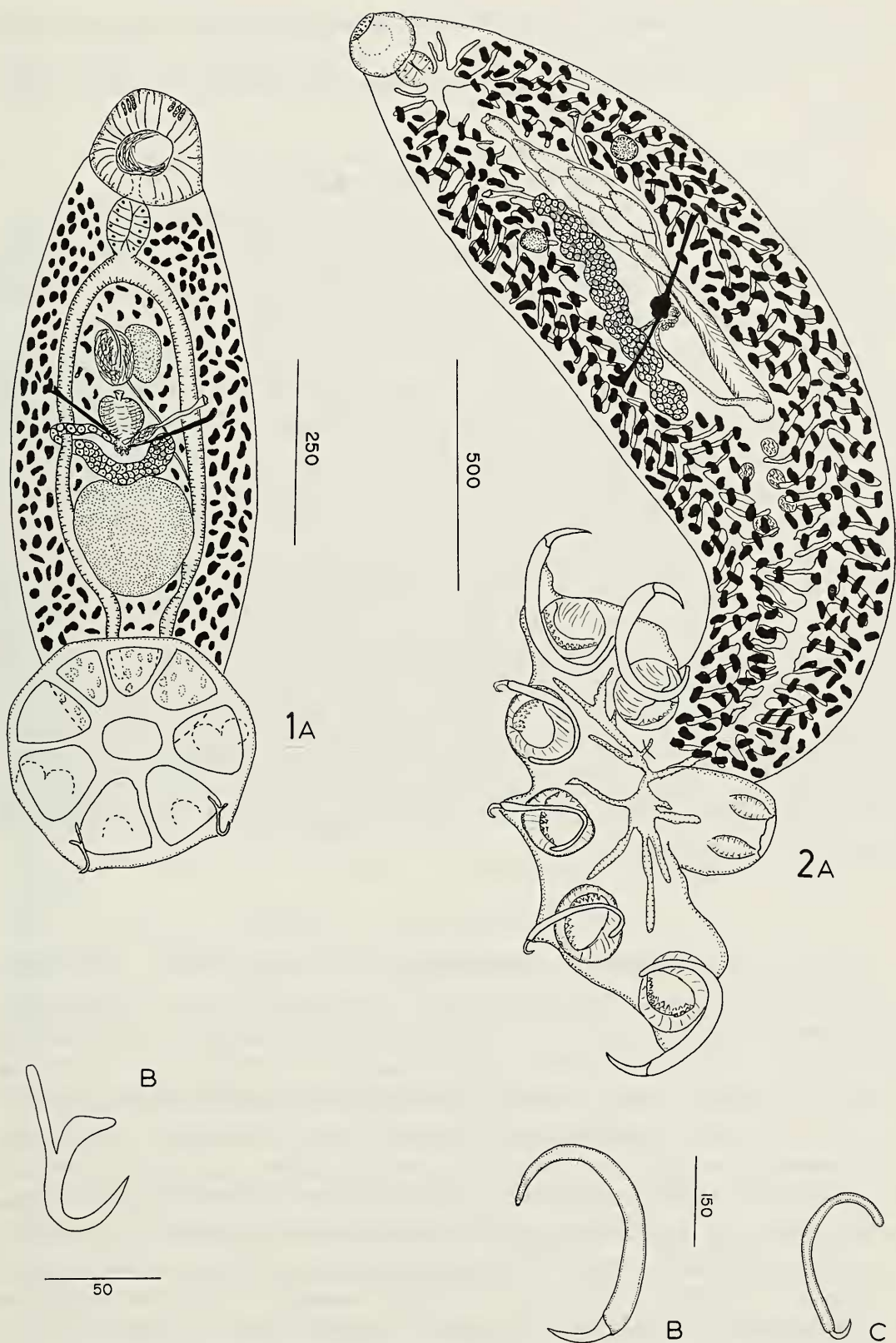
*Diagnosis*.—Monogenea, Monocotylidae. Prohaptor composed of sucker, esophagus leading to muscular pharynx. Intestinal crura bifurcate, terminating blindly near posterior end of body. Cirrus simple, tubular, cuticularized; prostatic bulb large. Ovary median, tubular, looping around right intestinal crurus. Uterus leading to muscular metraterm. Vitellaria extending from prohaptor to opisthaptor. Opisthaptor divided ventrally into 8 lateral loculi and single central loculus; septa lacking sinuous ridge or sclerites; 2 anchors and 14 hooks present; dorsal surface with 6 muscular papillae. Parasites of freshwater stingrays. South America.

*Type-species*.—*Potamotrygonocotyle tsalickisi*.

*Potamotrygonocotyle tsalickisi*, new species

Fig. 1

*Description*. (based on 10 specimens).—Body 703–923 (848) long by 235–300 (275) wide. Opisthaptor octagonal, 210–265 (243) long by 235–255 (248) wide, armed with pair of sickle-shaped anchors each 53–69 (61) long with short deep root and elongate superficial root. Marginal membrane of opisthaptor armed with 14 hooks each 5–7 (6) long. Dorsal surface of posterior pair of peripheral loculi each with single papilla; dorsal surface of next most posterior pair of loculi each with 2 papillae; papillae 33–42 (37) wide. Oral sucker subterminal, 112–130 (124) in diameter, with 3 paired small head organs on antero-lateral margins. Eyespots lacking. Mouth leading to muscular pharynx 62–92 (74) long by 53–60 (57) wide. Testis in posterior half of body 117–195 (158) long by 117–163 (139) wide. Copulatory complex composed of simple cuticularized cirrus, pyriform ejaculatory bulb, conspicuous prostatic reservoir. Vagina single, with ventro-sinistral opening.



Figs. 1, 2. Monogeneans from *Potamotrygon circularis*. 1, *Potamotrygonocotyle tsalickisi*: A, Ventral view of holotype; B, Close-up of anchor. 2, *Paraheteronchocotyle amazonensis*: A, Ventral view of holotype; B, Close-up of large anchor; C, Close-up of small anchor.



Vitellaria follicular, extending from pharynx to opisthaptor levels, confluent posttesticularly. Eggs not observed.

*Host*.—*Potamotrygon circularis* Garman (Chondrichthyes: Potamotrygonidae).

*Site of infection*.—Gills.

*Locality*.—Itacuai River, 5 km SE Atalaia do Norte, Brazil.

*Holotype*.—USNM Helm. Coll. Paratypes: USNM Helm. Coll.

*Etymology*.—This species is named in honor of Mr. Mike Tsalickis, Leticia, Colombia who aided us greatly in our collections. The genus is named for the family of stingrays which it is known to inhabit.

*Remarks*.—*Potamotrygonocotyle tsalickisi* most closely resembles members of *Heterocotyle* Scott, 1904 by possessing vitelline follicles extending from the level of the pharynx to near the opisthaptor, an opisthaptor with one central and eight peripheral loculi and armed with a pair of anchors as well as a prohaptor which is an oral sucker. The new species possesses preoral glands which *Heterocotyle* species lack and lacks sclerites in the septa, which *Heterocotyle* species possess. By having dorsal muscular papillae on the opisthaptor, *P. tsalickisi* resembles *Neoheterocotyle inpristi* Hargis, 1955. However, the holotype of *N. inpristi* (USNM Helm. Coll. No. 38139) possesses sclerotized papillae (those of the new species are not sclerotized), lacks an oral sucker, exhibits vitelline follicles extending only to the anterior margin of the posterior one-third of the body, and possesses anchors which are more dactylogyroid-like than monocotylid in shape. Based on the characters discussed above, the new species cannot be accommodated within *Heterocotyle* or *Neoheterocotyle* and we therefore propose the new genus for it.

#### *Paraheteronchocotyle*, new genus

*Diagnosis*.—Monogenea, Hexabothriidae, Hexabothriinae. Opisthaptor with 6 subequal suckers in semicircular arrangement on posterior margin, each armed with single hook. Hooks divided into 2 groups; first group large and robust, with point forming continuous arc with shaft; second group small and slender, with recurved points and shaft and narrowing juncture of point and shaft. Opisthaptoral appendix lacking hooks; 2 muscular suckers present at posterior end. Prohaptor an oral sucker. Large muscular pharynx present, esophagus lacking. Intestinal crura with diverticula; joined posteriorly; with confluent branch extending into opisthaptor. Testes few, preovarian. Cirrus unarmed. Common genital pore present. Ovary tubular-elongate, in middle third of body. Uterus enlarged distally into egg sac. Vaginal opening ventro-lateral, posterior to genital pore. Vitellaria follicular, extending from level of pharynx to posterior end of body, not extending

into opisthaptor. Eggs with single filament at one pole. Parasites of freshwater stingrays. South America.

*Type-species.*—*Paraheteronchocotyle amazonensis*.

*Paraheteronchocotyle amazonensis*, new species

Fig. 2

*Description* (based on 5 specimens).—Body 1.92–2.70 mm (2.20 mm) long by 463–515 (496) wide. Opisthaptor wedge-shaped, 346–475 (435) long by 718–1030 (925) wide; armed with 6 subequal suckers 117–169 (143) long by 130–183 (156) wide. Sucker hooks dissimilar in size and morphology; larger hooks in positions 1,2,6 240–300 (276) long with point 98–110 (100) long, point joining shaft in continuous arc; smaller hooks in positions 3,4,5 192–240 (217) long with point 53–70 (61) long; point joining shaft at narrowing of hook, recurved. Haptoral appendix lacking hooks, 187–228 (214) long, with paired terminal suckers. Prohaptor with terminal oral sucker 122–147 (136) long by 146–176 (168) wide. Pharynx 60–98 (78) in diameter. Testes few, located in anterior  $\frac{1}{2}$  of body, preovarian, 53–57 in diameter in section. Ejaculatory bulb muscular, unarmed. Ovary dextral, elongate, coiling into posterior  $\frac{1}{2}$  of body, anterior extremity within testicular field. Proximal portion of uterus muscular, expanding anteriorly into egg sac opening at common genital pore; genital pore median, ventral, in anterior  $\frac{1}{5}$  of body. Vitellaria follicular, extending from level of pharynx to opisthaptor. Vaginae bilateral, opening ventro-laterally, posterior to genital pore; seminal receptacle not observed. Eggs with filament at one end 130–138 (134) long by 44–52 (49) wide excluding filament.

*Host.*—*Potamotrygon circularis* Garman (Chondrichthyes: Potamotrygonidae)

*Site of infection.*—Gills.

*Locality.*—Itacuai River, 5 km SE Atalaia do Norte, Brazil.

*Holotype.*—USNM Helm. Coll. Paratypes: USNM Helm. Coll.

*Etymology.*—The specific names refers to the general area in which the species occurs, whereas the generic name refers to the close relationship between the new species and members of *Heteronchocotyle*.

*Remarks.*—Members of the Hexabothriidae Price, 1942, possess opisthaptors comprising six suckers each armed with a hook (sometimes called a sclerite) and a haptoral appendix with two suckers. With the exception of *Paraheteronchocotyle amazonensis*, all hexabothriids possess a pair of anchors associated with the haptoral appendix. Previously described hexabothriids comprise two groups based on relative sizes of suckers and hooks: (1) those with suckers and hooks of subequal size and (2) those with suckers and hooks comprising two different size classes each. The new species thus

differs from all other members of the family by possessing uniform-sized suckers but unequal-sized hooks. *Paraheteronchocotyle amazonensis* appears to be most closely related to members of *Heteronchocotyle* Brooks, 1934, by possessing unequal-sized hooks and an unarmed rather than spinose cirrus.

We observed testes in only one of our five specimens, and that one was non-ovigerous. Brinkmann (1952) reported other observations of protandry among hexabothriids and we ascribe the lack of testes in four of our specimens to that phenomenon.

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(MAM) Environmental Sciences Research, 1702 Building, Dow Chemical USA, Midland, Michigan 48640; (DRB) Department of Zoology, University of British Columbia, 2075 Wesbrook Mall, Vancouver, B.C., Canada V6T 2A9; (TBT) School of Life Sciences, University of Nebraska–Lincoln, Lincoln, Nebraska 68588.